



# **Analysis of Management Options for the Area 2C and 3A Charter Halibut Fisheries for 2017**



**For the North Pacific Fishery Management Council  
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# Overview

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- ▶ Fishery review through 2016
- ▶ Analysis of management measures for 2017
  - ▶ Area 2C
  - ▶ Area 3A

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# Fishery review through 2016



# Preliminary charter estimates for 2016

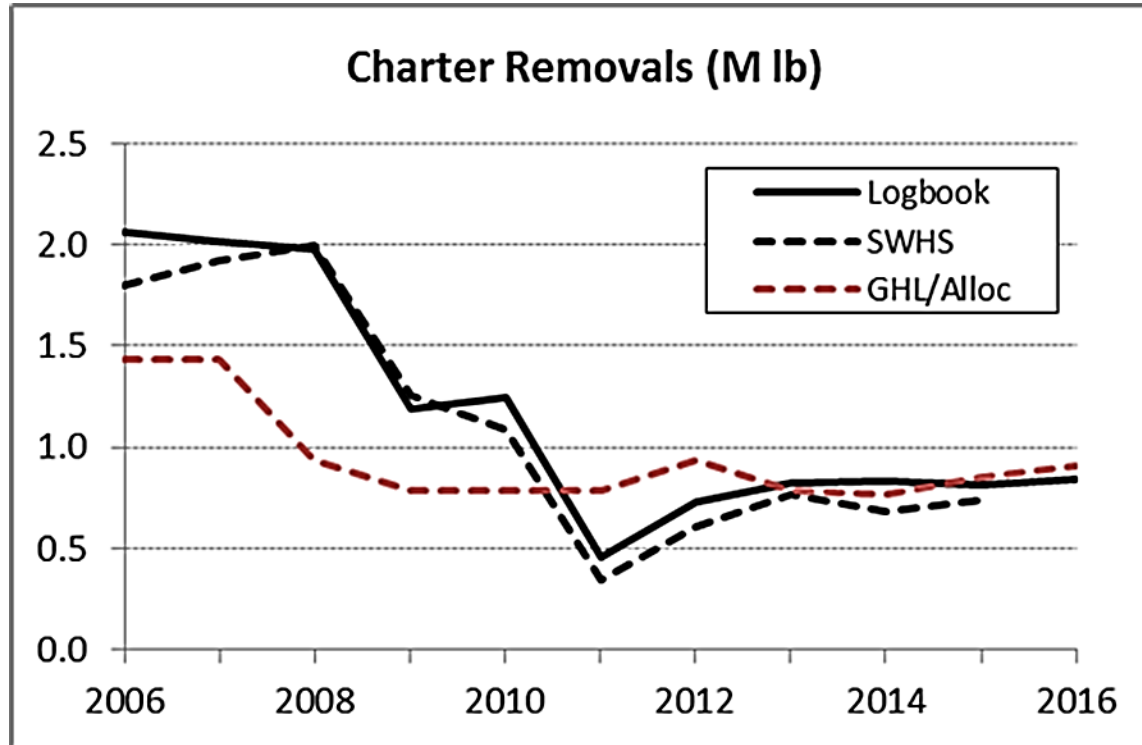
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Area	Mean wt (lb)	Prelim Logbook Harvest (no. fish)	Yield (M lb)	O26 RelMort (lb)	Total Charter Removals (M lb)	Allocation (M lb)	Overage (M lb)	Overage %
2C	11.95	66,286	0.792	51,599	843,646	906,000	-62,354	-6.9%
3A	12.67	155,032	1.964	16,473	1,980,523	1,814,000	166,523	9.2%



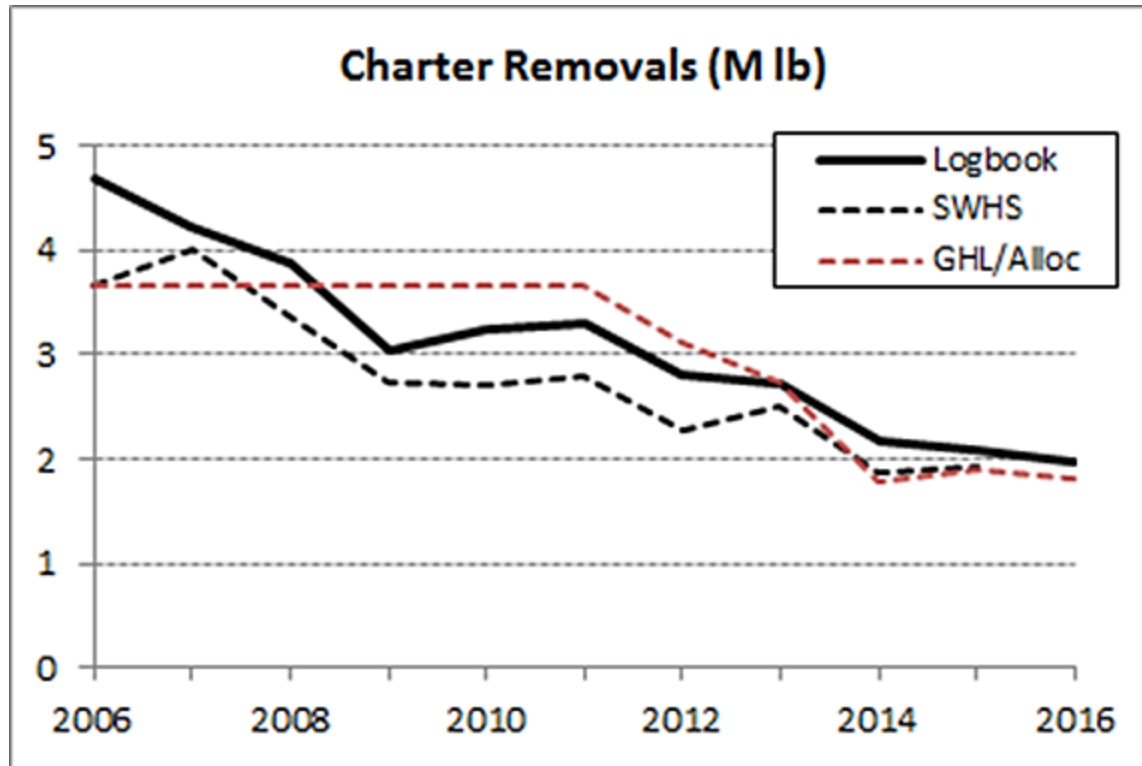
# Area 2C charter fishery

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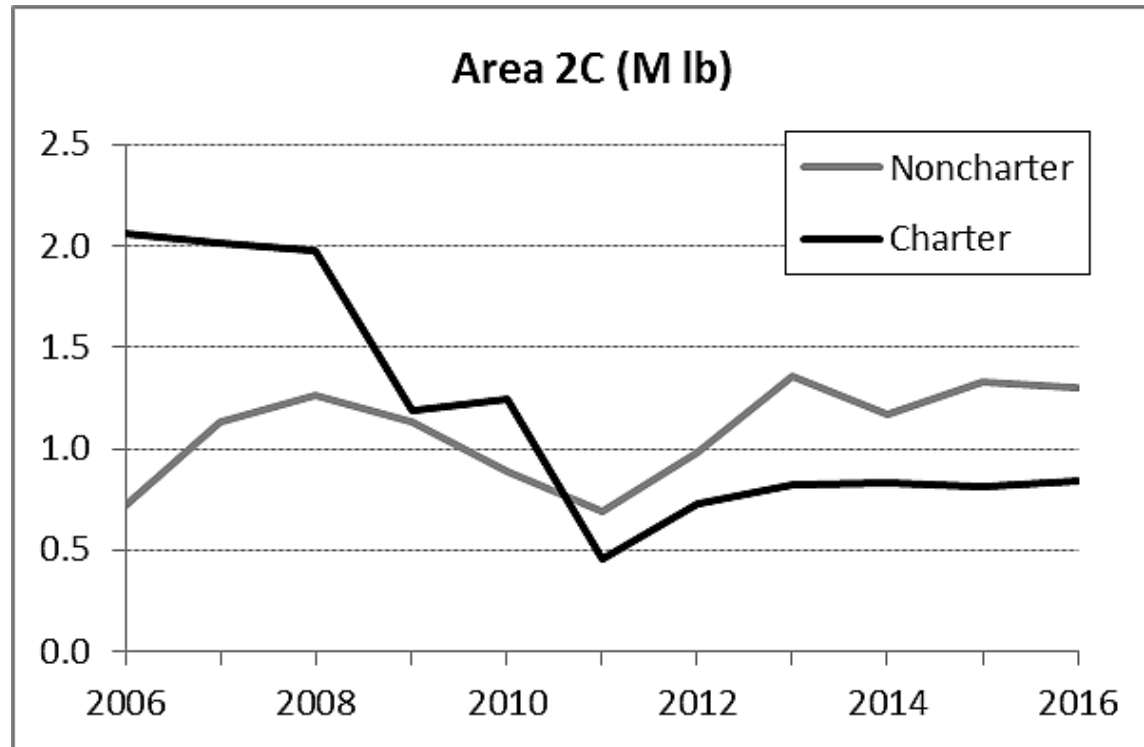
# Area 3A charter fishery

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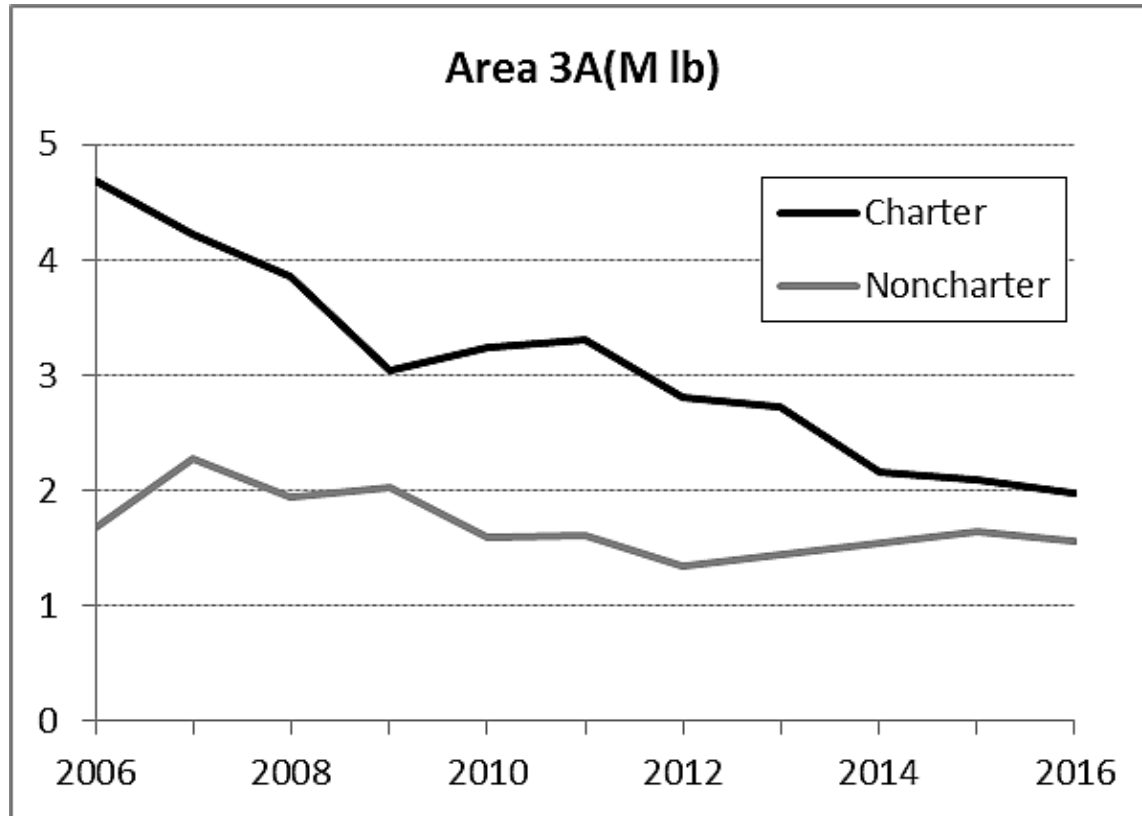
# Unguided fisheries

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# Unguided fisheries

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# Performance of Council-recommended management measures

Area	Year	Management measure	MgmtType	Allocation (M lb)	Removals (M lb)	Overage (M lb)	Overage Percent
2C	2012	One fish, U45-O68 rev. slot	GHL	0.931	0.605	-0.326	-35%
	2013	One fish, U45-O68 rev. slot	GHL	0.788	0.762	-0.026	-3%
	2014	One fish, U44-O76 rev. slot	CSP	0.761	0.827	0.066	9%
	2015	One fish, U42-O80 rev slot	CSP	0.851	0.814	-0.037	-4%
	2016	One fish, U43-O80 rev slot	CSP	0.906	0.844	-0.062	-7%
3A	2012	Two fish any size	GHL	3.103	2.284	-0.819	-26%
	2013	Two fish any size	GHL	2.734	2.514	-0.220	-8%
	2014	Two fish, one ≤ 29", one trip/day with halibut harvest.	CSP	1.782	2.068	0.286	16%
	2015	Two fish, one ≤ 29", Thursday closed Jun 15-Aug 31, annual limit 5 halibut, one trip/day with halibut harvest.	CSP	1.89	2.094	0.204	11%
	2016	Two fish, one ≤ 28", Wednesday closed all year, annual limit 4 halibut, one trip/day with halibut harvest.	CSP	1.814	1.981	0.167	9%

## Effectiveness/Compliance 2015 Annual Limit in Area 3A

- ▶ 5-fish annual limit
- ▶ No recording requirement
- ▶ 1% of charter clients exceeded the annual limit
- ▶ Excess harvest represented 0.5% of total harvest, and about 13% of the estimated harvest savings of the annual limit.

Hal Kept	Freq	Excess Harvest
6	543	543
7	59	118
8	34	102
9	10	40
10	9	45
11	2	12
12	1	7
13	1	8
	659	875
	Lic Anglers	All halibut
3A totals	68,800	163,632
% violation	1.0%	0.5%

# Analysis of management measures for 2017



## Area 2C - Measures for 2017

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Status quo: 1 fish bag limit, U43O80 reverse slot size limit

1. Reverse (protected) slot limit + annual limit
2. Maximum size limit + annual limit



# Area 2C allocations for 2017

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2017 Projected Harvest Under Status Quo (M lb)	Blue Line		Maintain Status Quo SPR	
	Charter Allocation (M lb)	Harvest Reduction Needed	Charter Allocation (M lb)	Harvest Reduction Needed
0.859	0.747	13.0%	0.858	0.1%

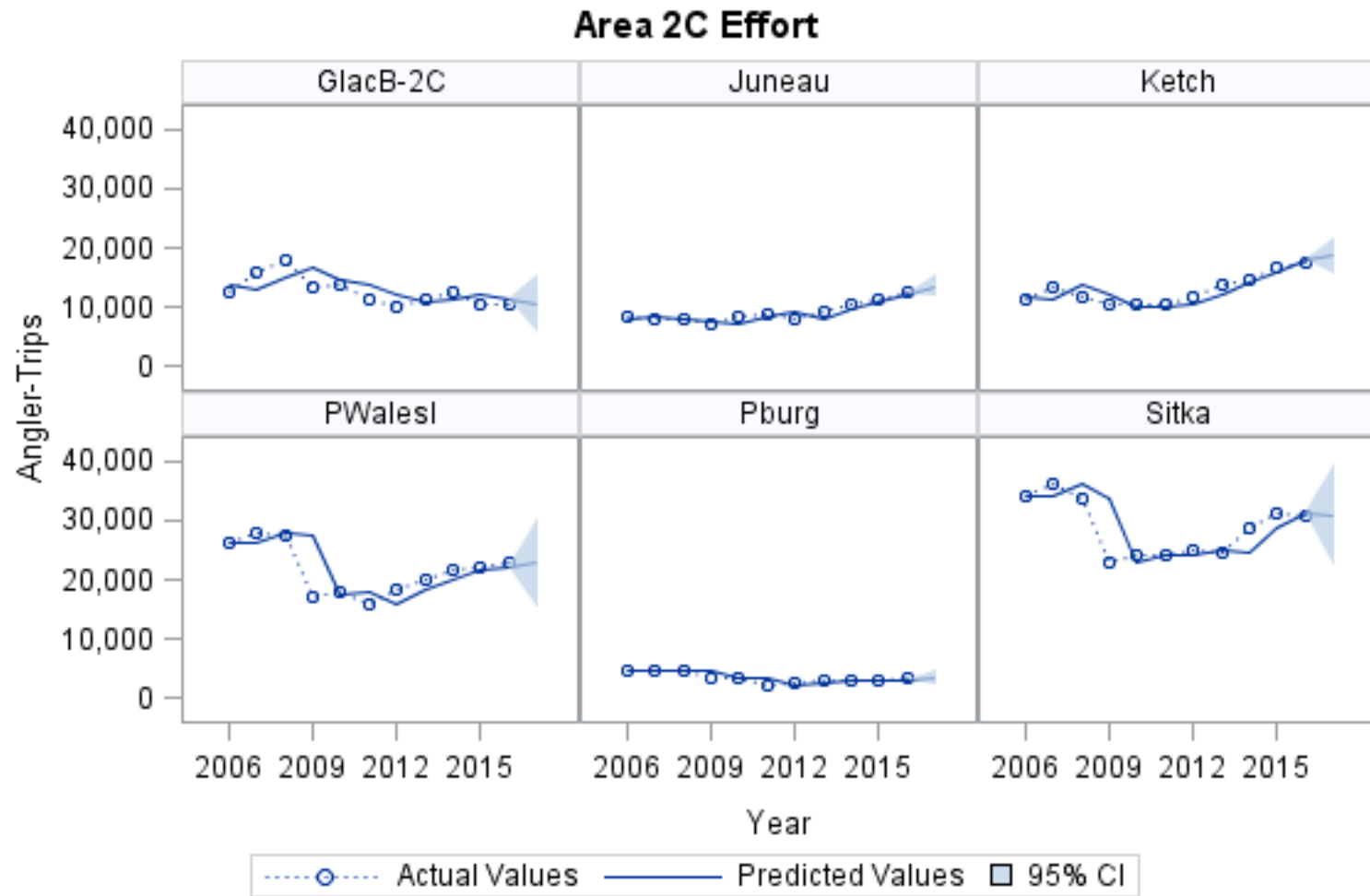


## Area 2C status quo forecast of charter removals

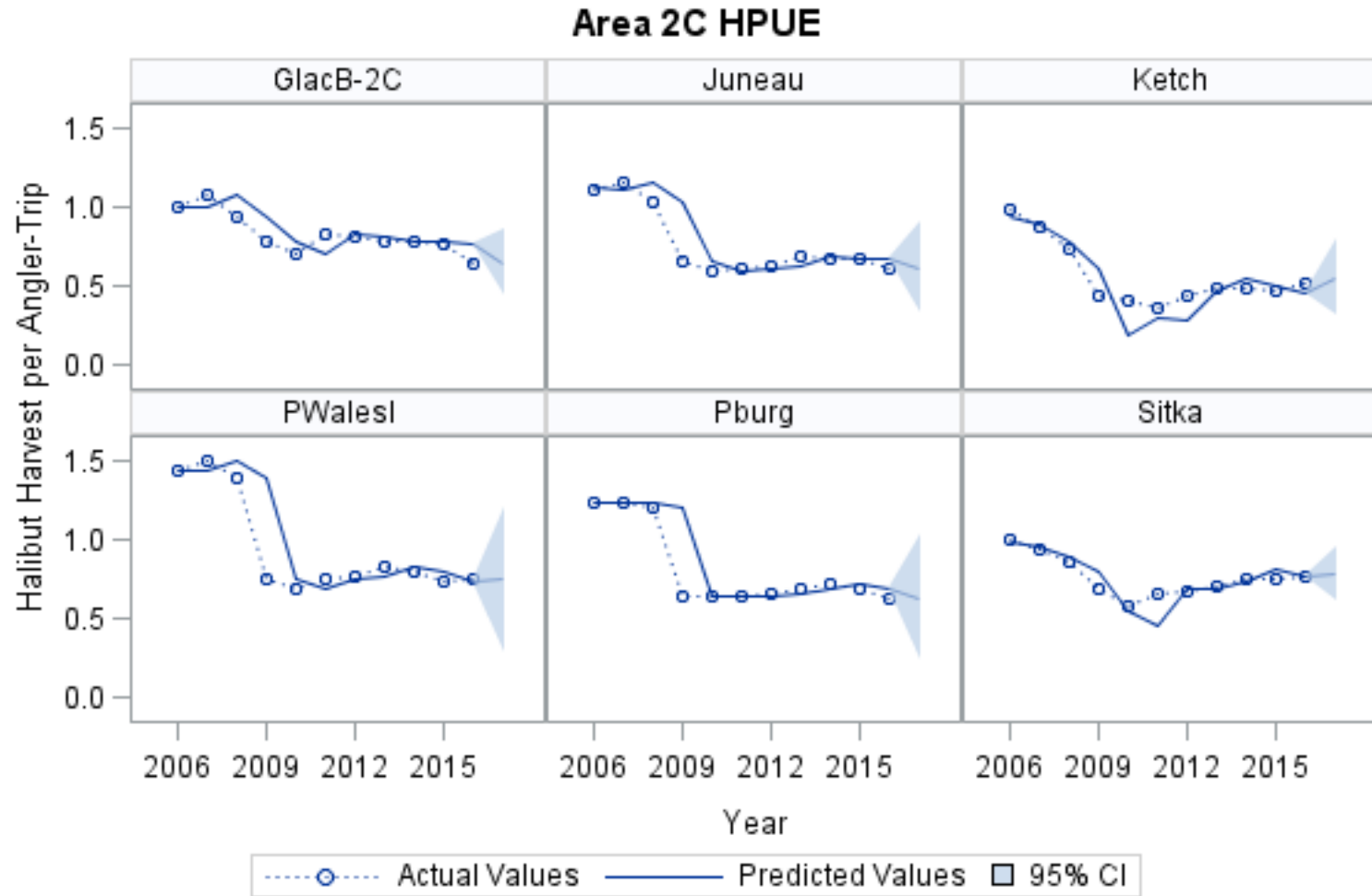
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- ▶ Forecast effort, HPUE → Harvest
- ▶ Harvest × predicted average weight → Yield
- ▶ Inflate to account for O26 release mortality → Removals

# Area 2C Effort Forecasts



# Area 2C HPUE Forecasts





# Area 2C – effect of annual limits

Annual Limit	Subarea						Area 2C
	Ketch	PWI	Pburg	Sitka	Jun	GlacB	
<b>Estimated percent of anglers affected by the annual limit:</b>							
1	26.00%	71.20%	52.80%	69.40%	46.60%	55.20%	57.50%
2	10.00%	42.30%	28.60%	38.70%	30.00%	37.40%	33.10%
3	2.20%	10.20%	11.70%	9.00%	14.60%	20.20%	10.10%
4	0.60%	1.90%	2.70%	1.30%	5.60%	9.20%	2.70%
5	0.10%	0.50%	0.40%	0.30%	1.80%	2.90%	0.80%
<b>Estimated percent change in harvest:</b>							
1	-28.10%	-55.80%	-49.20%	-54.30%	-49.80%	-56.30%	-50.20%
2	-9.40%	-24.40%	-22.50%	-22.60%	-26.40%	-32.20%	-22.50%
3	-2.20%	-5.70%	-7.90%	-5.00%	-11.40%	-15.90%	-6.70%
4	-0.60%	-1.10%	-2.00%	-0.80%	-4.00%	-7.00%	-1.90%
5	-0.20%	-0.30%	-0.60%	-0.20%	-1.20%	-3.00%	-0.60%
<b>Projected harvest (number of halibut):</b>							
1	7,435	7,501	1,052	11,010	4,200	2,995	34,194
2	9,372	12,843	1,608	18,647	6,157	4,647	53,274
3	10,116	16,019	1,909	22,913	7,419	5,768	64,143
4	10,279	16,786	2,032	23,905	8,033	6,374	67,410
5	10,321	16,928	2,061	24,051	8,269	6,651	68,282
None	10,341	16,979	2,073	24,107	8,369	6,855	68,724



# Area 2C – reverse slot limit + annual limit

- ▶ Blue Line allocation is 0.747 Mlb
- ▶ Status quo SPR allocation is 0.858 Mlb.

No annual limit, harvest = 68,724 halibut																
Lower Limit (in)	Upper Length Limit (in)															
	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
35	1.223	1.141	1.079	1.012	0.963	0.919	0.856	0.795	0.762	0.734	0.706	0.689	0.663	0.649	0.647	0.636
36	1.257	1.176	1.116	1.049	1.001	0.957	0.895	0.835	0.802	0.774	0.746	0.729	0.704	0.689	0.688	0.677
37	1.278	1.198	1.139	1.072	1.025	0.981	0.919	0.859	0.826	0.798	0.771	0.753	0.728	0.714	0.713	0.701
38	1.309	1.231	1.172	1.107	1.060	1.016	0.955	0.896	0.863	0.835	0.808	0.791	0.766	0.751	0.750	0.739
39	1.332	1.255	1.197	1.132	1.085	1.042	0.981	0.922	0.890	0.862	0.835	0.818	0.793	0.779	0.777	0.766
40	1.351	1.275	1.218	1.153	1.107	1.064	1.004	0.945	0.912	0.885	0.858	0.841	0.816	0.802	0.801	0.790
41	1.375	1.300	1.244	1.180	1.134	1.092	1.031	0.973	0.941	0.914	0.887	0.870	0.845	0.831	0.829	0.819
42	1.390	1.316	1.260	1.197	1.152	1.109	1.049	0.992	0.959	0.933	0.906	0.889	0.864	0.850	0.848	0.838
43	1.407	1.334	1.279	1.216	1.171	1.130	1.070	1.013	0.980	0.954	0.927	0.910	0.885	0.871	0.870	0.859
44	1.432	1.360	1.305	1.243	1.199	1.157	1.098	1.041	1.009	0.983	0.956	0.939	0.915	0.901	0.899	0.888
45	1.458	1.387	1.334	1.272	1.228	1.187	1.129	1.072	1.040	1.014	0.987	0.971	0.946	0.932	0.931	0.920
46	1.475	1.406	1.353	1.292	1.248	1.208	1.149	1.093	1.061	1.035	1.009	0.992	0.968	0.954	0.952	0.941
47	1.499	1.431	1.379	1.319	1.276	1.236	1.177	1.122	1.090	1.064	1.038	1.021	0.997	0.983	0.982	0.971
48	1.516	1.449	1.397	1.338	1.295	1.255	1.197	1.142	1.111	1.085	1.059	1.042	1.018	1.004	1.002	0.992
49	1.544	1.478	1.427	1.369	1.326	1.287	1.230	1.175	1.144	1.118	1.092	1.075	1.051	1.038	1.036	1.025
50	1.564	1.499	1.449	1.391	1.349	1.310	1.253	1.199	1.168	1.142	1.117	1.100	1.076	1.062	1.061	1.050



# Area 2C – maximum size limit

- ▶ Blue Line allocation is 0.747 Mlb
- ▶ Status quo SPR allocation is 0.858 Mlb.

Size limit (inches)	A. Projected total removals including release mortality (M lb).					
	Annual Limit (number of fish per year)					
	1	2	3	4	5	No Limit
30	0.229	0.358	0.431	0.453	0.459	0.462
31	0.247	0.384	0.463	0.486	0.492	0.495
32	0.268	0.417	0.502	0.527	0.534	0.537
33	0.283	0.439	0.529	0.555	0.563	0.566
34	0.300	0.466	0.560	0.589	0.596	0.600
35	0.313	0.486	0.584	0.614	0.622	0.626
36	0.335	0.519	0.623	0.655	0.664	0.668
37	0.348	0.539	0.647	0.681	0.689	0.694
38	0.368	0.569	0.684	0.719	0.729	0.734
39	0.382	0.592	0.711	0.747	0.757	0.762
40	0.395	0.611	0.734	0.771	0.782	0.787
41	0.411	0.635	0.762	0.801	0.812	0.818
42	0.420	0.650	0.781	0.821	0.833	0.839
43	0.431	0.667	0.802	0.843	0.855	0.861
44	0.447	0.691	0.830	0.874	0.886	0.892
45	0.464	0.717	0.861	0.906	0.919	0.926
46	0.475	0.735	0.883	0.929	0.942	0.949
47	0.491	0.760	0.912	0.960	0.973	0.980
48	0.503	0.777	0.932	0.981	0.995	1.002
49	0.520	0.804	0.965	1.016	1.030	1.038
50	0.533	0.824	0.990	1.042	1.057	1.065
51	0.547	0.846	1.016	1.070	1.085	1.093
52	0.567	0.876	1.053	1.108	1.124	1.133
53	0.579	0.896	1.076	1.133	1.149	1.157
54	0.595	0.921	1.106	1.165	1.181	1.190
55	0.609	0.943	1.133	1.192	1.209	1.219

# Area 3A Measures for 2017

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1. Maximum size limit on one fish + annual limit
2. Close an additional day of the week, July 1 – August 15
3. Status quo with reverse slot on one fish
4. Status quo + 1-fish bag limit during:
  - a) July
  - b) June 16 – August 15

# Area 3A allocations for 2017

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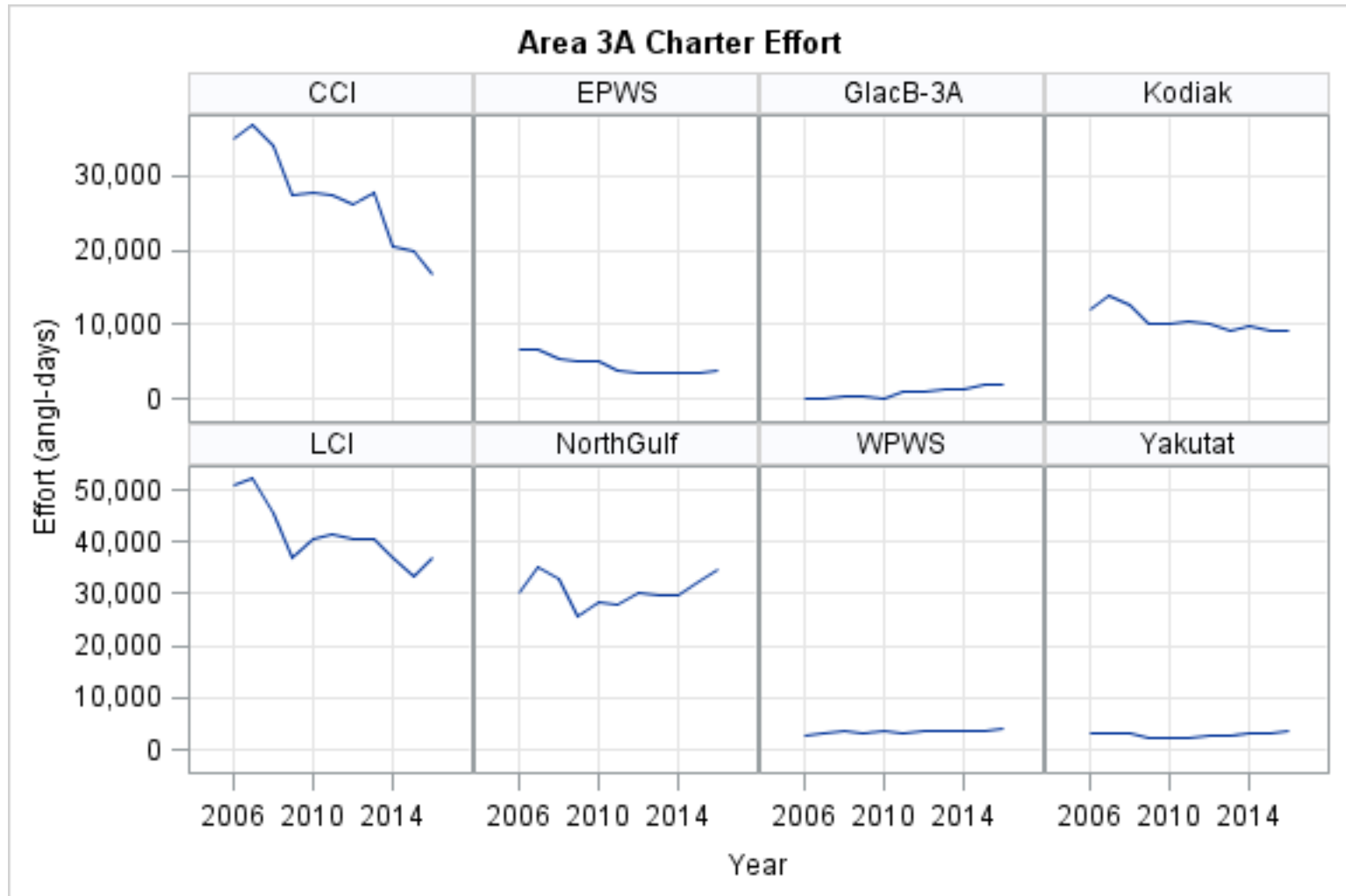
2017 Projected Harvest Under Status Quo (M lb)	Blue Line		Maintain Status Quo SPR	
	Charter Allocation (M lb)	Harvest Reduction Needed	Charter Allocation (M lb)	Harvest Reduction Needed
1.951	1.778	8.9%	1.890	3.2%

## Area 3A status quo forecast of charter removals

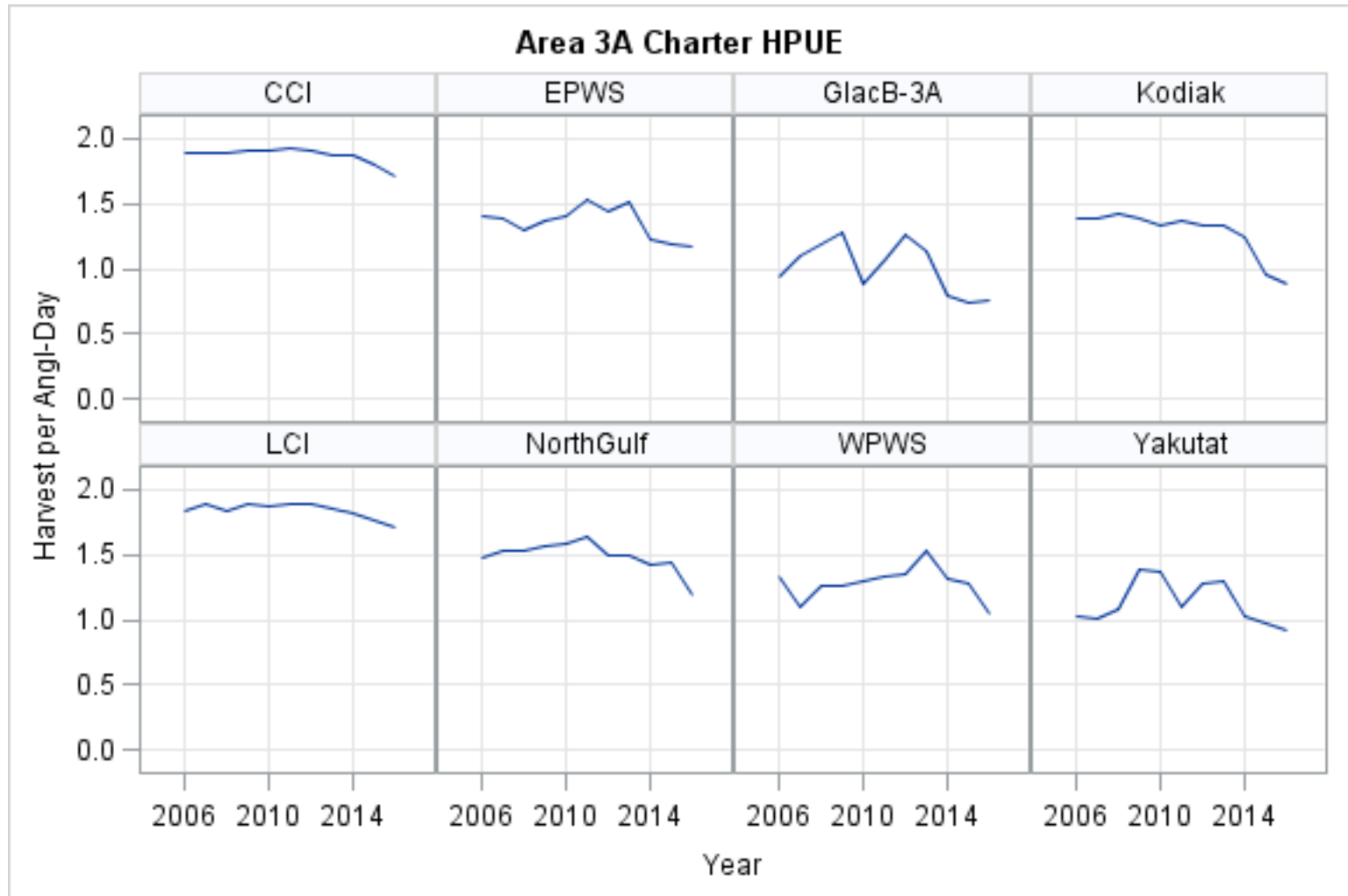
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- ▶ Status quo: 2-fish bag limit with 28-inch max. size limit on one fish, annual limit 4 halibut, one vessel-trip per permit per day, fishery closed Wednesdays.
- ▶ Forecast effort, HPUE → Harvest  
(used effort and HPUE from 2016)
- ▶ Harvest × predicted average weight → Yield
- ▶ Inflate to account for O26 release mortality → Removals

# Area 3A effort



# Area 3A HPUE





# Area 3A – effect of annual limits

Annual Limit	Subarea								
	CCI	EPWS	GlacBay	Yak	LCI	NGulf	Kod	WPWS	Area 3A
<b>Estimated percent of anglers affected by an annual limit:</b>									
2	18.0%	9.7%	16.3%	21.3%	19.1%	12.3%	40.8%	9.0%	17.6%
3	16.3%	6.3%	5.1%	10.1%	17.2%	9.5%	30.5%	4.6%	14.6%
4	5.0%	1.3%	0.5%	4.0%	4.2%	2.8%	18.9%	0.5%	4.5%
5	4.3%	0.6%	0.0%	1.3%	3.6%	1.9%	12.9%	0.0%	3.5%
6	1.5%	0.2%	0.0%	0.8%	1.1%	0.7%	8.4%	0.0%	1.4%
7	1.3%	0.1%	0.0%	0.6%	0.9%	0.4%	6.1%	0.0%	1.1%
8	0.6%	0.0%	0.0%	0.1%	0.3%	0.2%	2.9%	0.0%	0.4%
9	0.5%	0.0%	0.0%	0.0%	0.2%	0.1%	1.8%	0.0%	0.3%
10	0.3%	0.0%	0.0%	0.0%	0.1%	0.1%	0.5%	0.0%	0.2%
<b>Estimated percent change in harvest:</b>									
2	-19.9%	-10.4%	-12.9%	-20.1%	-19.6%	-13.3%	-41.0%	-8.0%	-18.6%
3	-12.6%	-4.9%	-3.3%	-8.9%	-11.7%	-7.5%	-27.5%	-2.9%	-11.1%
4	-5.9%	-1.3%	-0.3%	-3.6%	-4.5%	-3.1%	-17.4%	-0.3%	-4.9%
5	-3.8%	-0.5%	0.0%	-1.4%	-2.8%	-1.7%	-11.1%	0.0%	-3.0%
6	-2.0%	-0.2%	0.0%	-0.7%	-1.3%	-0.9%	-6.8%	0.0%	-1.6%
7	-1.4%	-0.1%	0.0%	-0.3%	-0.8%	-0.5%	-4.0%	0.0%	-1.0%
8	-0.9%	0.0%	0.0%	0.0%	-0.5%	-0.3%	-2.0%	0.0%	-0.6%
9	-0.7%	0.0%	0.0%	0.0%	-0.4%	-0.2%	-1.0%	0.0%	-0.4%
10	-0.5%	0.0%	0.0%	0.0%	-0.2%	-0.2%	-0.5%	0.0%	-0.3%
<b>Projected harvest (number of halibut):</b>									
2	24,107	4,138	1,343	2,645	53,506	37,052	5,839	3,899	132,527
3	26,333	4,393	1,492	3,016	58,784	39,531	7,180	4,114	144,842
4	28,352	4,558	1,538	3,192	63,542	41,443	8,182	4,225	155,032
5	28,967	4,593	1,542	3,262	64,703	42,006	8,805	4,237	158,116
6	29,499	4,609	1,542	3,285	65,702	42,384	9,230	4,238	160,490
7	29,681	4,615	1,542	3,299	65,995	42,520	9,507	4,238	161,396
8	29,838	4,617	1,542	3,309	66,231	42,609	9,706	4,238	162,090
9	29,907	4,618	1,542	3,310	66,315	42,644	9,801	4,238	162,374
10	29,965	4,618	1,542	3,310	66,384	42,670	9,859	4,238	162,586
None	30,114	4,618	1,542	3,310	66,549	42,750	9,904	4,238	163,025

Area 3A	
17.6%	
14.6%	
4.5%	
3.5%	
1.4%	
1.1%	
0.4%	
0.3%	
0.2%	
-18.6%	
11.1%	
-4.9%	
-3.0%	
-1.6%	
-1.0%	132,527
-0.6%	144,842
-0.4%	155,032
-0.3%	158,116
	160,490
	161,396
	162,090
	162,374
	162,586
	163,025

# Area 3A – maximum size limit on one fish + annual limit

- ▶ Blue Line allocation is 1.778 Mlb
- ▶ Status quo SPR allocation is 1.890 Mlb.

Projected Removals (M lb)

Size Limit (in)	Annual Limit (number of halibut)									
	2	3	4	5	6	7	8	9	10	No Limit
26	1.606	1.756	1.872	1.908	1.934	1.945	1.953	1.956	1.958	1.963
27	1.632	1.785	1.903	1.939	1.966	1.977	1.985	1.988	1.991	1.995
28	1.673	1.829	1.951	1.988	2.016	2.027	2.035	2.038	2.041	2.046
29	1.835	2.006	2.139	2.181	2.211	2.223	2.233	2.236	2.239	2.245
30	1.912	2.091	2.232	2.276	2.308	2.322	2.332	2.336	2.339	2.344

## Area 3A – close an additional day of the week ( July 1 – August 15)

Subarea	Sun	Mon	Tue	Wed	Thu	Fri	Sat
CCI	8.2%	10.3%	9.0%	0.1%	8.2%	7.8%	8.4%
EPWS	7.5%	9.0%	8.6%	0.4%	9.6%	11.6%	12.8%
G	10.0%	11.4%	7.9%	0.0%	8.9%	7.9%	7.9%
H	5.5%	5.0%	6.1%	0.0%	6.8%	6.4%	5.0%
LCI	9.0%	8.9%	7.5%	0.1%	8.2%	9.5%	8.6%
NG	8.1%	9.5%	9.2%	0.0%	9.3%	10.0%	10.8%
QR3A	9.0%	10.1%	9.5%	0.2%	8.9%	9.3%	7.1%
WPWS	6.9%	7.8%	6.3%	0.2%	9.3%	10.0%	8.0%
Area 3A	8.5%	9.3%	8.3%	0.1%	8.6%	9.3%	9.1%

- ▶ Table shows maximum possible reduction
- ▶ Effects vary by subarea
- ▶ Overall effect is about 9% per day

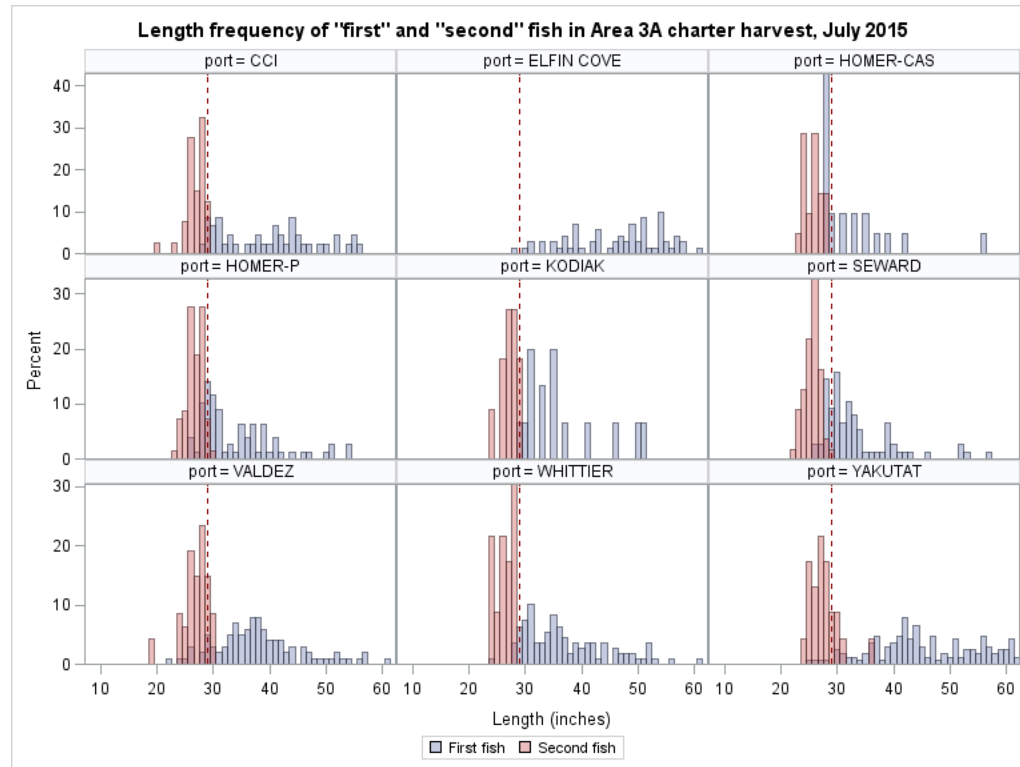
# Area 3A – Status quo + reverse slot limit on one fish

- ▶ Blue Line allocation is 1.778 Mlb
- ▶ Status quo SPR allocation is 1.890 Mlb.

Lower Limit (in)	Upper Length Limit (in)										
	60	62	64	66	68	70	72	74	76	78	80
28	1.275	1.258	1.237	1.220	1.209	1.204	1.199	1.196	1.193	1.190	1.184
29	1.323	1.307	1.285	1.269	1.258	1.253	1.248	1.245	1.242	1.238	1.233
30	1.395	1.380	1.358	1.342	1.331	1.326	1.321	1.318	1.315	1.311	1.306
40	1.742	1.727	1.707	1.691	1.681	1.676	1.671	1.668	1.666	1.662	1.657
41	1.759	1.744	1.723	1.708	1.698	1.692	1.688	1.685	1.682	1.678	1.673
42	1.771	1.756	1.736	1.720	1.710	1.705	1.700	1.697	1.695	1.691	1.686
43	1.790	1.776	1.755	1.740	1.730	1.724	1.720	1.717	1.714	1.711	1.706
44	1.801	1.786	1.766	1.750	1.740	1.735	1.731	1.728	1.725	1.721	1.716
45	1.814	1.799	1.779	1.764	1.754	1.748	1.744	1.741	1.738	1.735	1.730
46	1.823	1.808	1.788	1.773	1.763	1.757	1.753	1.750	1.747	1.744	1.739
47	1.838	1.823	1.803	1.788	1.778	1.773	1.769	1.766	1.763	1.759	1.754
48	1.847	1.832	1.812	1.797	1.787	1.782	1.778	1.775	1.772	1.768	1.764
49	1.866	1.852	1.832	1.816	1.807	1.801	1.797	1.794	1.791	1.788	1.783
50	1.881	1.866	1.846	1.831	1.822	1.816	1.812	1.809	1.806	1.803	1.798
51	1.895	1.881	1.861	1.846	1.836	1.831	1.827	1.824	1.821	1.818	1.813
52	1.910	1.896	1.876	1.862	1.852	1.847	1.842	1.839	1.837	1.833	1.828
53	1.920	1.907	1.887	1.872	1.862	1.857	1.853	1.850	1.847	1.844	1.839
54	1.938	1.924	1.905	1.890	1.880	1.875	1.871	1.868	1.865	1.862	1.857
55	1.946	1.932	1.913	1.898	1.888	1.883	1.879	1.876	1.873	1.870	1.865
56	1.959	1.946	1.926	1.912	1.902	1.897	1.893	1.890	1.887	1.884	1.879
57	1.976	1.962	1.943	1.928	1.918	1.913	1.909	1.906	1.904	1.900	1.895
58	1.989	1.975	1.956	1.942	1.932	1.927	1.922	1.919	1.917	1.913	1.909
59	2.003	1.989	1.970	1.956	1.946	1.941	1.937	1.934	1.931	1.928	1.923
60	2.018	2.005	1.986	1.971	1.962	1.957	1.952	1.949	1.947	1.943	1.939

## Area 3A – Status quo + 1-fish bag limit during peak season

- ▶ Two options to define peak season – (1) July, (2) mid-June through mid-August
- ▶ Harvest reduced by the proportion of second fish during the period
- ▶ Average weight during peak season = average of “first” fish in 2016



## Area 3A – Status quo + 1-fish bag limit during peak season

- ▶ Two Blue Line allocation is 1.778 Mlb
- ▶ Status quo SPR allocation is 1.890 Mlb

Option	1-fish bag limit		Remainder of year		Totals for the Entire Year				
	Harvest (no. fish)	Avg wt (lb)	Harvest (no. fish)	Avg wt (lb)	Harvest (no. fish)	AvgWt (lb)	Yield (M lb)	RelMort (M lb)	Removals (M lb)
July	31,491	19.29	99,330	12.41	130,820	14.07	1.840	0.028	1.868
Jun 16 - Aug 15	58,570	18.77	50,972	12.45	109,543	15.83	1.734	0.026	1.760

- ▶ Harvest reduction may be overstated
- ▶ Average weight could be underestimated if additional highgrading

# Area 3A –status quo + Tuesday closures

- ▶ Few options under max size on one fish + annual limit.
- ▶ Need about 9% reduction from status quo forecast
- ▶ Adding another day of the week during the period July 1 – August 15 potentially reduces removals 8.9%.

**Projected Removals (M lb)**

Size Limit (in)	Annual Limit (number of halibut)									
	2	3	4	5	6	7	8	9	10	No Limit
26	1.458	1.594	1.699	1.732	1.756	1.765	1.772	1.775	1.777	1.782
27	1.481	1.620	1.727	1.760	1.785	1.794	1.802	1.805	1.807	1.811
28	1.519	1.660	1.771	1.805	1.830	1.840	1.847	1.850	1.852	1.857
29	1.664	1.820	1.941	1.979	2.006	2.018	2.026	2.029	2.032	2.037
30	1.735	1.898	2.025	2.065	2.095	2.107	2.116	2.119	2.122	2.127

## Area 3A –status quo + Tuesday closures

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- ▶ Blue line allocation is 1.778 M lb.
- ▶ Status quo SPR allocation is 1.890 M lb.
- ▶ Adding another day of the week during the period July 1 – August 15 potentially reduces removals 1.3% per day.

Number of Tuesdays closed							
7	6	5	4	3	2	1	None
1.771	1.796	1.822	1.848	1.874	1.899	1.925	1.951

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- ▶ Countless technicians – halibut measurements and angler interviews
- ▶ Charter operators, crews, clients
  
- ▶ Funding:
  - State of Alaska General Funds
  - DJ-VWB Federal Aid in Fish Restoration
  - NOAA grant for logbook data??

